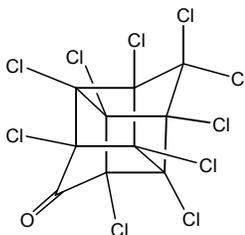


KEPONE® (CHLORDECONE)

CAS No. 143-50-0

First Listed in the *Second Annual Report on Carcinogens*



CARCINOGENICITY

Kepone® (chlordecone) is *reasonably anticipated to be a human carcinogen* based on sufficient evidence of carcinogenicity in experimental animals (IARC 1979, 1987). When administered in the diet, Kepone® induced hepatocellular carcinomas in rats and mice of both sexes.

No adequate human studies of the relationship between exposure to Kepone® and human cancer have been reported (IARC 1979).

PROPERTIES

Kepone® is the trade name of the synthetic chlorinated insecticide kepone, which is a ketone analog and degradation product of mirex (see Mirex). Kepone® is a tan-to-white solid that is practically insoluble in water, but soluble in strongly alkaline aqueous solutions, alcohols, ketones, dimethyl sulfoxide, acetic acid, and hydrocarbon solvents such as hexane and benzene (IARC 1979 HSDB 2000).

USE

Kepone® is no longer used in the United States. First introduced in 1958, Kepone® was used until 1978 as an insecticide for leaf-eating insects, ants and cockroaches, and as a larvicide for flies (IARC 1979). Kepone® was used on bananas, non-bearing citrus trees, tobacco, ornamental shrubs, lawns, turf, and flowers (HSDB 2000).

PRODUCTION

Chem Sources identified one domestic supplier of kepone for 1990 (Chem Sources 1991). In 2001, Chem Sources identified eight U.S. suppliers of the compound (Chem Sources 2001). Kepone® is no longer manufactured in the United States (SRI 1986). In July 1975, the Virginia State Health Department ordered termination of production by the sole manufacturer of Kepone® when several workers developed serious neurological disorders (NIOSH 1976a). Before the shutdown, the estimated average annual production was 882,000 lb. More than 99% of the production was exported; only 0.8% was available for domestic use, primarily as bait in ant traps (IARC 1979).

EXPOSURE

The primary routes of potential human exposure to Kepone[®] are inhalation, ingestion, and dermal contact. Its occurrence in human body fluids has been reported. In 1976, NIOSH identified 50 establishments processing or formulating pesticides using the chemical and estimated that about 600 workers were possibly exposed to Kepone[®] in the workplace (NIOSH 1976b).

Kepone is a degradation product of the insecticide mirex. Investigators have detected kepone in soil at a level of 0.02 µg/g of soil 12 years after an application rate of mirex of 1 µg/g. In the United States, detectable levels of kepone were found in 400 samples of air, drinking water, plant and aquatic organisms, and municipal waste where Kepone[®] was manufactured (IARC 1979). Additional exposure information may be found in the ATSDR Toxicological Profile for Mirex and Chlordecone (ATSDR 1995).

Kepone is very stable in the environment. No degradation products have been identified. When released to soil, kepone will adsorb to soils. Some leeching to groundwater may occur. When released to water, kepone will adsorb to the sediment. It will bioaccumulate in fish, but not in certain crustaceans. The half-life of kepone in a model river is 2.8 to 46 years. In the air, kepone will directly photodegrade or react with photochemically produced hydroxy radicals or ozone. Kepone will adsorb into particulate matter in the atmosphere, so it will also be subject to gravitational settling (HSDB 2000).

REGULATIONS

EPA regulates Kepone[®] under the Clean Water Act (CWA), Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), and Resource Conservation and Recovery Act (RCRA). A CWA hazardous spill regulation established a reportable quantity (RQ) of 1 lb and imposed reporting requirements. This RQ also applies to releases regulated under CERCLA. RCRA designates Kepone[®] as a carcinogen and regulates it under the hazardous waste disposal rule. In 1977, formulators of Kepone[®] voluntarily cancelled production. EPA cancelled the registration of Kepone[®] under FIFRA, with all registered products effectively cancelled by 1978.

NIOSH has recommended that, in the workplace, Kepone[®] levels be limited to 1 µg/m³ as an 8-hour time-weighted average (TWA). OSHA regulates Kepone[®] under the Hazard Communication Standard and as a chemical hazard in laboratories. Regulations are summarized in Volume II, Table 100.

REFERENCES

ATSDR. Agency for Toxic Substances and Disease Registry. Toxicological Profile for Mirex and Chlordecone. (Final Report) Atlanta, GA: ATSDR, Public Health Service, U.S. Department of Health and Human Services. 1995. 362 pp. NTIS Accession No. PB95-264354.

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